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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/058,174	01/25/2002	John Cauchi	M-12423 US	3666

32605 7590 10/23/2003

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EXAMINER

ROSASCO, STEPHEN D

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 10/23/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

AS

Office Action Summary

Application No.

10/058,174

Applicant(s)

CAUCHI, JOHN

Examiner

Stephen Rosasco

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 April 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2. 6) ☐ Other:

Detailed Action

Claims 1-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are not written in such a way that they unambiguously describe the invention. In the last section of the independent claims 1 and 9, "wherein the non-clear region..." the limitation that the non-clear region of the first mask extends beyond the non-clear region of the second mask is unclear in that it could extend in any direction, and to any extent. The extent of overlap is also not clear where the non-clear region of the first mask covers a position of the non-clear region of the second mask.

In general given the above it is difficult to construct the invention from the language of the claims.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-13 are rejected under 35 U.S.C. 102(e) as being anticipated by Kling et al. (6,566,019).

The claimed invention is directed to a mask set and a method of using a mask set to pattern a layer of material. The two masks are exposed separately in order to control the exposure at the ends of lines where corner rounding or line end shortening are a problem. A photoresist layer is exposed two or more times. One exposure is conducted through a regular mask, and one exposure through a modified mask with a non-clear region extending beyond a convex boundary of the non-clear region of the regular mask. The exposure through the modified mask allows one to reduce the exposure dose used with the regular mask, and thus alleviates the resist overexposure near convex areas of the non-clear pattern of the regular mask. The exposure of two masks in this way does not require the use of hammerheads at the line ends.

Kling et al. teach a system that facilitates a semiconductor fabrication process to create a line end in a manner that controls line end shortening arising from optical effects, and is especially applicable in alternating aperture phase shifting. This system operates by positioning a first mask over a photoresist layer on a surface of a semiconductor wafer. This first mask includes opaque regions and transmissive regions that are organized into a first pattern that defines an unexposed line on the photoresist layer. The system then exposes the photoresist layer through the first mask. The system also positions a second mask over the photoresist layer on the surface of the semiconductor wafer. This second mask includes opaque regions and transmissive regions that are organized into a second pattern that defines an exposure region. This exposure region cuts through the unexposed line on the photoresist layer to create the line end in the unexposed line, without the optical line end shortening that arises from

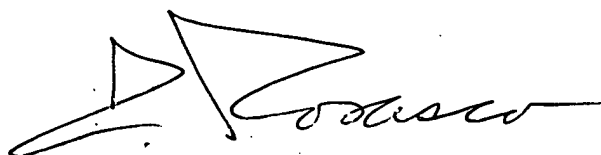
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creating the line end with a single mask. The system then exposes the photoresist layer through the second mask.

The teachings of Kling et al. do not specifically address that the method alleviates the resist overexposure near convex areas of the non-clear pattern of the regular mask, as is recited in claims 5-7 and 10-12. However, the method of Kling et al. would work as well with squared off or convex areas, as the problem of OPC is typically at the corners with corner rounding. And therefore, this teaching would be held to be inherent in Kling et al.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Rosasco whose telephone number is (703) 308-4402.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661. Fax (703) 872-9310 Before Finals; 872-9311 After Finals.

A handwritten signature in black ink, appearing to read 'S. Rosasco', with a stylized, angular initial 'S'.

S. Rosasco
Primary Examiner
Art Unit 1756

S. Rosasco
10/8/03